CLAIMS

[1]   A mobile communication terminal comprising:

image projection means for projecting an operation-plane image that displays virtually an operation-plane of an operation device operated by users;

5   operation detection means for detecting operation on the operation-plane image projected by the image projection means; and

data processing means for performing a predetermined data process based on the detection result of operation detected by the operation detection means.

[2]   A mobile communication terminal according to claim 1, wherein

10   the image projection means is configured to be capable of projecting for each of a plurality of kinds of mutually different operation-plane images; and

the operation detection means has a plurality of kinds of mutually different recognition functions to recognize operation content by at least one of position, direction and movement of an operation object on the plurality of kinds of operation-plane images.

15   [3]   A mobile communication terminal according to claim 2, the mobile communication terminal comprising designation means for designating at least one of the plurality of kinds of recognition functions; wherein

the image projection means projects an operation-plane image corresponding to the recognition function designated by the designation means; and

20   the operation detection means detects operation on the operation-plane image by using the recognition function designated by the designation means.

[4]   A mobile communication terminal according to claim 2, the mobile communication terminal comprising application execution management means for managing application program execution environment; wherein

25   the image projection means projects an operation-plane image corresponding to

the recognition function designated by the application execution management means; and

the operation detection means detects operation on the operation-plane image by using the recognition function designated by designation information received from the application execution management means.

5 [5] A mobile communication terminal according to claim 2, the mobile communication terminal comprising designation means for designating at least one of the plurality of kinds of operation-plane images; wherein

the image projection means projects an operation-plane image designated by the designation means, and

10 the operation detection means detects operation on the operation-plane image by using the recognition function corresponding to the operation-plane image designated by the designation means.

[6] A mobile communication terminal according to claim 2, the mobile communication terminal comprising application execution management means for

15 managing application program execution environment; wherein

the image projection means projects an operation-plane image designated by designation information received from the application execution management means; and

the operation detection means detects operation on the operation-plane image by using the recognition function corresponding to the operation-plane image designated by

20 designation information received from the application execution management means.

[7] A mobile communication terminal according to claim 1, the mobile communication terminal comprising:

memory means for memorizing a plurality of image data corresponding to each of a plurality of kinds of operation-plane images;

25 application program execution management means for executing an application

program selected from a plurality of kinds of application programs; and

instruction generation means for generating an operation-plane image selection instruction in accordance with content of the selected application program; wherein

the image projection means selects an image data from the plurality of image data

5   memorized in the memory based on the operation-plane image selection instruction generated by the instruction generation means, and projects the operation-plane image of the selected image data; and

the application program execution management means performs a data process corresponding to operation detected by the operation detection means in accordance with

10   the content of the application program during execution of the selected application program.

[8]   A mobile communication terminal according to claim 1, the mobile communication terminal comprising:

application program execution management means for executing an application

15   program selected from a plurality of application programs and performing a data process corresponding to operation detected by the operation detection means in accordance with the content of the application program; and

data readout means for reading out image data of an operation-plane image included in the content of the application program; wherein

20   the image projection means projects an operation-plane image based on the image data read out by the data readout means when executing the selected application program.

[9]   A mobile communication terminal according to one of claims 1 to 8, wherein

the operation detection means detects operation on the operation-plane image, and

the mobile communication terminal further comprises control means for changing

25   at least one portion of the operation-plane image in accordance with content of operation

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detected by the operation detection means.

[10]   A mobile communication terminal according to claim 9, wherein the control means changes an image portion that is subject to operation detected by the operation detection means.

5   [11]   A mobile communication terminal according to one of claims 1 to 10, wherein

the image projection means comprises a light source, a spatial light modulation unit for modulating light output from the light source, and an optical system for projection imaging that projects by imaging a light image output from the spatial light modulation unit on an external projection screen.

10   [12]   A mobile communication terminal according to claim 11, the mobile communication terminal comprising an optical system for diffused illumination for homogeneously illuminating by diffusing light output from the light source to an external illumination plane, wherein

the light source and the spatial light modulation unit are both shared to generate a

15   light image subject to projection and generate a light subject to diffused illumination.

[13]   A mobile communication terminal according to claim 12, the mobile communication terminal comprising:

a camera unit that generates image data by transforming the light-image to electric signals; and

20   an optical system for camera imaging for imaging the light image subject to shooting on the camera unit; wherein

the operation detection means is configured by using operation object detection means for detecting at least one of position, direction, and movement of an operation object operating on the operation-plane image and operation detection data generation

25   means for generating operation detection data corresponding to position, direction or

movement of the operation object based on the detection results of the operation object detection means; and

the camera unit and the optical system for camera imaging are both shared as the operation object detection means.

5　[14]　A mobile communication terminal according to one of claims 1 to 13, wherein

the operation-plane image projected by the image projection means is a key layout image that virtually displays a keyboard arranged with a plurality of keys; and

the operation detection means detects which key is selected on the key layout image.

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